

FY04, 05 Priorities and Plans BNL Dipole R&D - Update

Michael Anerella
Superconducting Magnet Division
Brookhaven National Laboratory
Upton, NY 11973 USA

LARP Dipole R&D Priorities

- Finalize magnetic design (previous R. Gupta talk)
- Open midplane mechanical analysis
- Heat transfer analysis – work to follow mechanical analysis (needs new Mohkov data)
- Develop remaining cold mass structure
- Build R&D coils, cold mass

- Base Program work:
 - Cable development
 - 10 turn coils
 - 12T magnet

LARP Dipole Mechanical Analysis

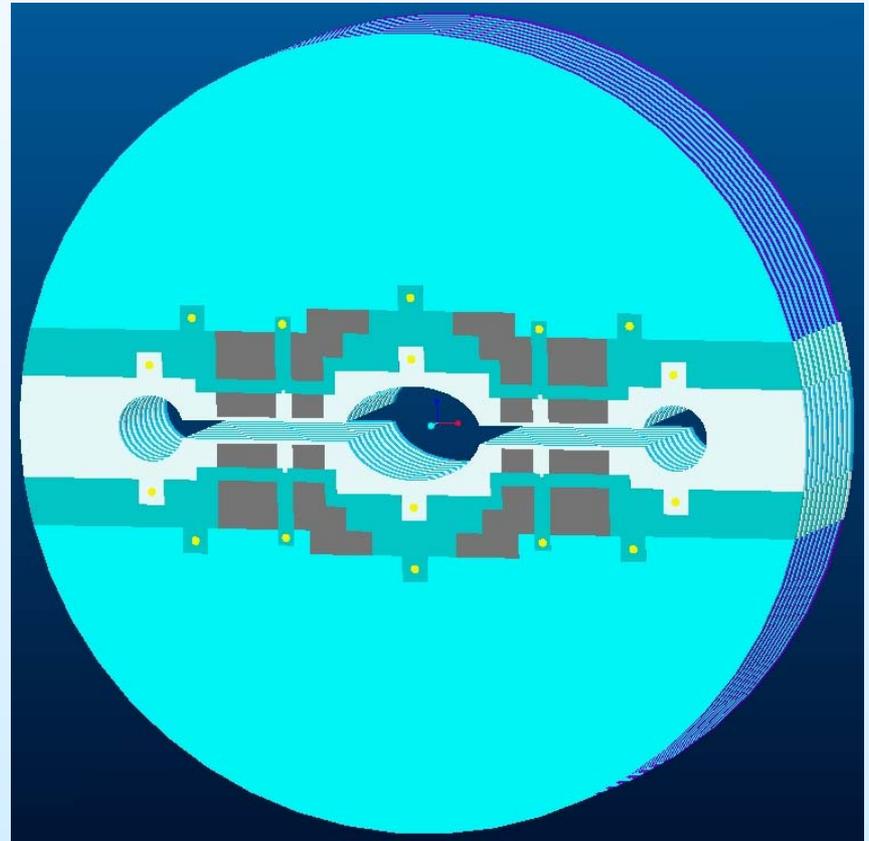
Revised Laminated Collar support

Features:

- Open midplane
- Easy (inexpensive) to build
- Accurate geometry
- Heat absorbed at 80K
- Support bridges minimize coil stress accumulation

Issues:

- Cable instability
- Deflections
- Secondary 4K heating
- Constrictive '04, '05 Funding (need more \$ for conductor, multiple tests, alternate design, etc.)



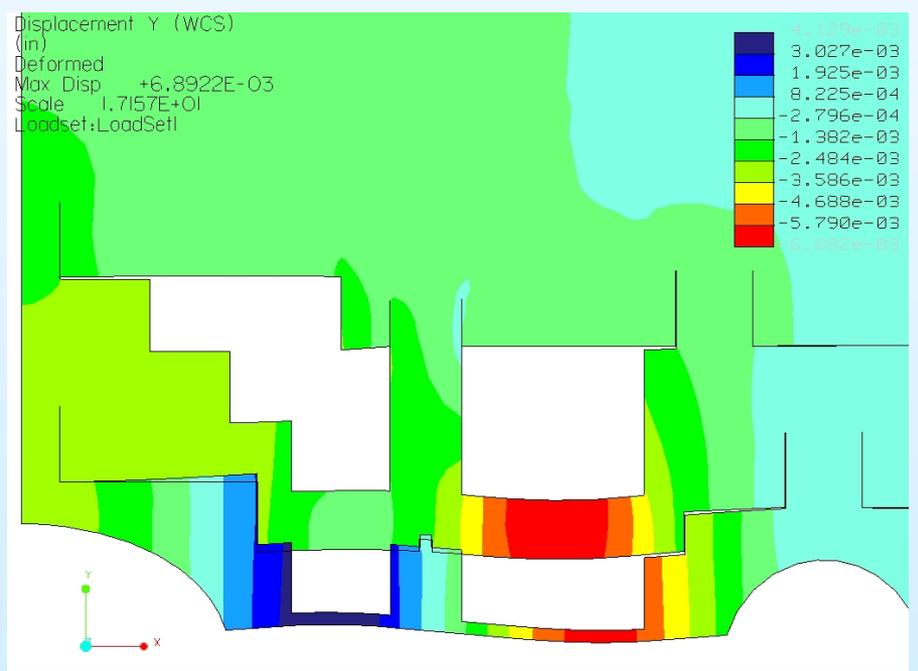
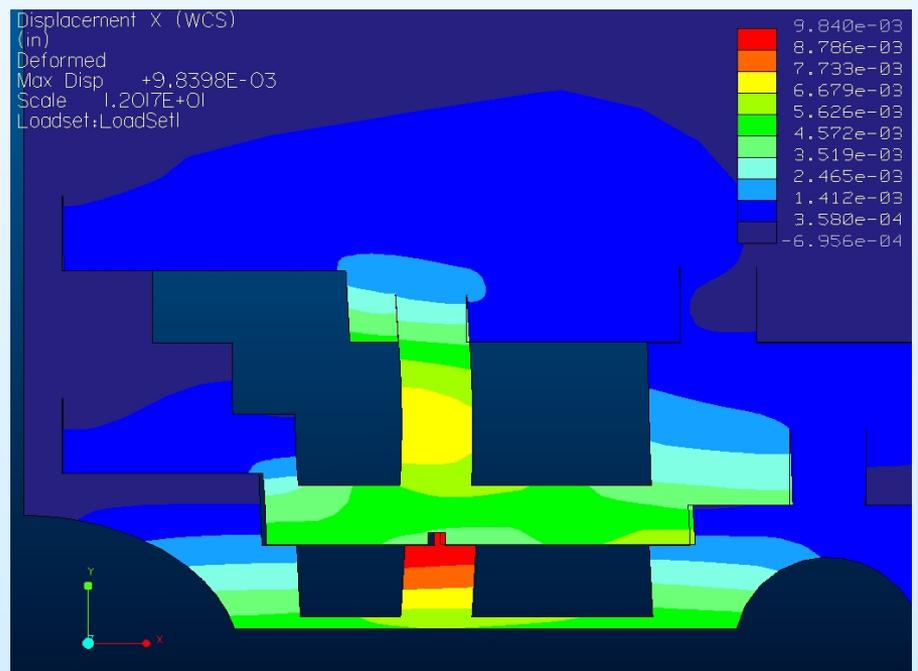
LARP Dipole Mechanical Analysis

Revised Laminated Collar support (cont'd)

X - Deflections

Y - Deflections

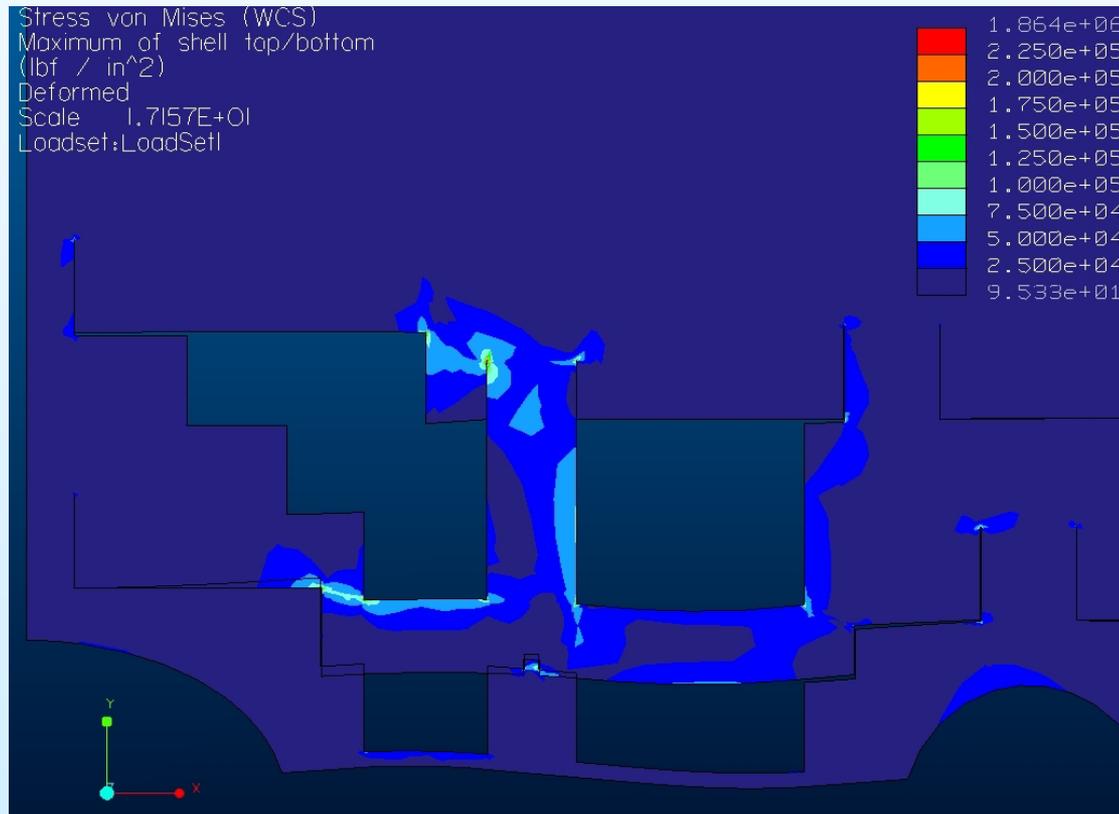
max relative deflection ~4 mils



LARP Dipole Mechanical Analysis

Revised Laminated Collar support (cont'd)

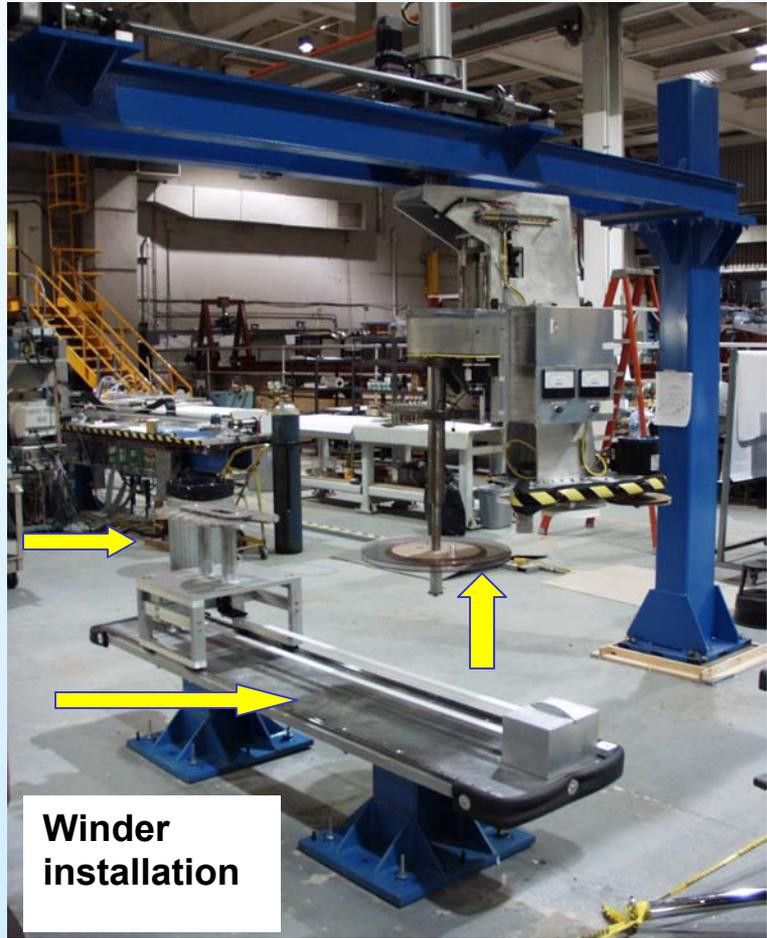
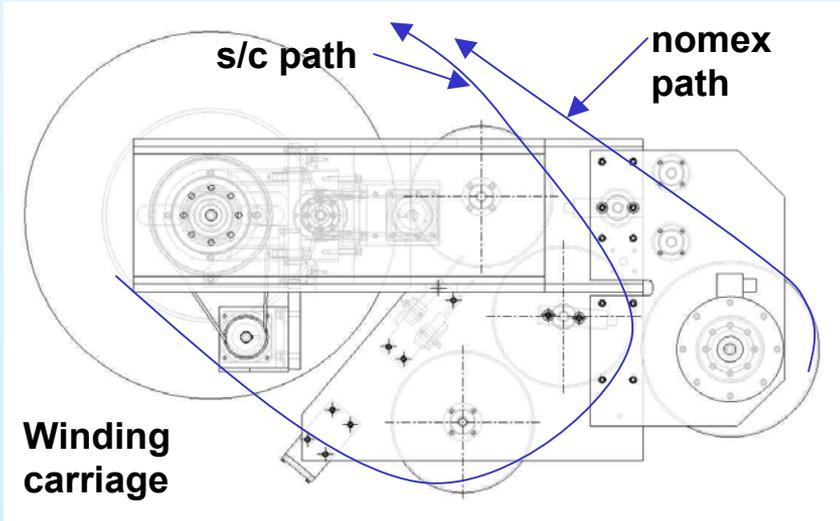
Stresses



Base Program Support

Coil Winder Status

- Mechanical Assembly complete
 - wiring underway
 - computer interface underway
- ⇒ **operational 3/04**

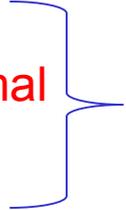


FY04, FY05... Plan Summary

LARP

FY04: (\$165K)

- Finalize magnetic design
- complete mechanical analysis and initiate thermal analysis
- Develop external structure to restrain collars



**Iterative
exercise**

FY05: (~\$500K)

- Complete cold mass design
- Complete thermal analysis
- Build R&D coils
- Build “simplified” cold mass

FY06:

- Test magnet in cryostat:
 - Quench / field uniformity tests
 - Heat load / temp tests

FY04, FY05 Plan Summary

Base Program Support

FY04:

- **Cable Development & testing** (“need to make 1M Nb₃Sn samples work”)
- **10 turn coil winding**
- **10 turn test magnet assembly & test**
- **12T coil winding**

FY05:

- **12T magnet assembly & test**

Summary

- **Good progress so far on LARP R&D and Base Program**
- **Lots more to be accomplished in the near term**
- **Continued interaction between mechanical – magnetic design – accelerator folks is crucial**

*Thanks Ramesh for murdering my nice incomprehensive fonts.